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**UNITED STATES DISTRICT COURT  
 NORTHERN DISTRICT OF CALIFORNIA  
 SAN FRANCISCO DIVISION**

HUAWEI TECHNOLOGIES CO., LTD.,  
 HUAWEI DEVICE USA, INC., and  
 HUAWEI TECHNOLOGIES USA, INC.,

Plaintiffs / Counterclaim-Defendants,  
 v.

SAMSUNG ELECTRONICS CO., LTD.,  
 SAMSUNG ELECTRONICS AMERICA,  
 INC.,

Defendants / Counterclaim-Plaintiffs,  
 and

SAMSUNG RESEARCH AMERICA,

Defendant,  
 v.

HISILICON TECHNOLOGIES CO., LTD.,  
 Counterclaim-Defendant.

Case No. 16-cv-02787-WHO

**HUAWEI’S OPPOSITION TO  
 SAMSUNG’S MOTION FOR SUMMARY  
 JUDGMENT**

Hearing Date: August 8, 2018  
 Time: 2:00 PM  
 Judge: Hon. William H. Orrick

**REDACTED VERSION OF DOCUMENT  
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1 Plaintiffs and Counter-Defendants Huawei Technologies Co., Ltd., Huawei Device USA, Inc.  
 2 and Huawei Technologies USA, Inc., and HiSilicon Technologies, Co., Ltd. (collectively,  
 3 “Huawei”) hereby oppose Defendants and Counter-Plaintiffs Samsung Electronics Co., Ltd. and  
 4 Samsung Electronics America, Inc., and Defendant Samsung Research America, Inc. (collectively  
 5 “Samsung”) Motion for Summary Judgment (“SS MSJ Mot.”) (ECF No. 333-2).

## 6 **I. INTRODUCTION**

7 Samsung moves for summary judgment of non-infringement and invalidity of Huawei’s ‘239  
 8 patent, non-infringement of Huawei’s ‘613 patent and validity of Samsung’s ‘105 patent. In each  
 9 instance, Samsung fails to meet its burden for judgment as a matter of law.

10 The law is clear. A party is only entitled to summary judgment where it “shows that there is  
 11 no genuine dispute as to any material fact and [it] is entitled to judgment as a matter of law.” Fed. R.  
 12 Civ. P. 56(a). A dispute is genuine if it could reasonably be resolved in favor of the nonmoving  
 13 party. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986). A fact is material where it could  
 14 affect the outcome of the case. *Id.*

15 The nonmoving party need not show that the issue will be conclusively resolved in its favor.  
 16 *Id.* at 248-49. All that is required is the identification of sufficient evidence to create a genuine  
 17 dispute of material fact, thereby “requir[ing] a jury or judge to resolve the parties’ differing versions  
 18 of the truth at trial.” *Id.* (internal quotation marks omitted).

19 On summary judgment, the court draws all reasonable factual inferences in favor of the  
 20 nonmoving party. *Id.* at 255. “Credibility determinations, the weighing of the evidence, and the  
 21 drawing of legitimate inferences from the facts are jury functions, not those of a judge.” *Id.*

22 As explained more fully below, Samsung in many instances misstates the record. Huawei  
 23 responds by providing the Court with a full and accurate record, demonstrating that Samsung is not  
 24 entitled to judgment as a matter of law. In other instances, Samsung attempts to create a factual  
 25 issue, to which Huawei responds with evidence that, at the very least, precludes entry of summary  
 26 judgment. For Huawei’s inequitable conduct defense there is no dispute – Huawei is not pursuing  
 27 the defense to Samsung’s ‘105 patent, so the issue is not before the Court.  
 28

## II. ARGUMENT

### A. The Court Should Deny Samsung's Motion for Summary Judgment of Non-Infringement of the '239 Patent.

#### 1. The Samsung Devices Infringe The "Group Number k" Limitation.

Based on its misreading of a single paragraph in Huawei's expert report, Samsung seeks summary judgment of non-infringement on the grounds that Huawei has been inconsistent in its identification of what satisfies the limitation "*group number k*" in the asserted claims of Huawei's U.S. Patent No. 8,644,239 ("the '239 patent").<sup>1</sup> However, the record demonstrates that Huawei has applied this limitation the same way throughout its infringement contentions and has always pointed to the same value as satisfying this limitation. Accordingly, Samsung's motion should be denied.

The Court construed the term "*group number k of a sequence group allocated by the system*" to mean "a group number k allocated by the system, where the group number k identifies a sequence group and where the value k is the same throughout the claim." *Markman Order* 9:19-21 (Aug. 31, 2017), ECF No. 168. Consistent with this construction, Huawei and its expert consistently mapped the value " $u + 1$ " in the LTE standard to the claimed "*group number k*." Declaration of Cory Szczepanik in Support of Opp'n to SS MSJ Mot. ("Szczepanik Decl.") Ex. 1, HW 239 Inf. Cont. at 5 ("The following terms in the claim are met as indicated by the LTE standard: . . . 'Group number k of a sequence group' =  $u+1$ ."); SS MSJ Mot. Ex. B, Veeravalli '239 Infr. Rpt. ¶ 253 (ECF No. 333-9) ("In the LTE standard, the 'group number k of a sequence group' is ' $u+1$ ,' where u is determined as explained in the previous paragraph. The processing required by the LTE standard uses the same value of k, that is ' $u+1$ ,' throughout the processing that corresponds to this claim."); *See* SS MSJ Mot. 3:14-16 (quoting SS MSJ Mot. Ex. C, Veeravalli Dep. 136:10-14 (ECF No. 333-11) ("Q. But you don't provide any analysis in your report of the scenario where k equals U? You only provide the analysis of where k equals U plus 1? A. That's correct, yes.")).

In spite of this clear record, Samsung contends that Huawei "defies this Court's Claim Construction Order" by allegedly mapping the value " $u$ " to the claimed "*group number k*" in one instance and the value " $u+1$ " in others. SS MSJ Mot. 4:13-14. Samsung's argument relies on

<sup>1</sup> The technology in the '239 patent is explained in Huawei's Opp. to Samsung's Mot. to Dismiss. Dkt. 86 at 7:6-9:9.

misreading paragraph 252 in Dr. Veeravalli's (Huawei's expert) report, which explains how the Samsung products acquire the value "*u*." *Id.* at 3:3-7. That paragraph does not map "*u*" to the claimed "group number *k*." In fact, nowhere does Dr. Veeravalli opine that the value "*u*" corresponds to the claimed "group number *k*." Rather, acquiring the value "*u*" is a necessary precursor to obtaining the value "*u*+1," which Huawei has consistently identified as the "group number *k*." Paragraph 252 explains how Samsung's products acquire "*u*."

Samsung also misreads Dr. Veeravalli's doctrine of equivalents analysis. SS MSJ Mot. 3:26-4:10. As an initial matter, a doctrine of equivalents analysis is separate from a literal infringement analysis, and allegations made in a doctrine of equivalents analysis do not affect the viability of a literal infringement analysis. Nonetheless, Huawei's expert opined in his doctrine of equivalents analysis that deriving "*u*" and "*u*+1" from precursors received from the system would at least be an equivalent to "obtaining . . . a group number *k* [*i.e.*, '*u*+1'] from the system." SS MSJ Ex. B, Veeravalli '239 Infr. Rpt. ¶ 254. As explained in Huawei's concurrently-filed Opposition to Samsung's Motion to Strike Portions of Huawei's Expert Report, at pp. 4-5, this equivalents argument addresses Samsung's recent assertion that the claim term "obtaining" should be rewritten to mean "receiving" the "group number *k*" directly from the cell network, with no calculations allowed. *See also* HW Daubert 14:25-15:23 (Jul. 3, 2018), ECF No. 327-4.

## **2. The Samsung Devices Infringe the "Sequences" Limitation.**

### **a. Samsung's Indefiniteness Argument Should Be Rejected.**

Samsung simply misreads the claim language to argue that the term "sequences" as used in asserted claims 7 and 18 is indefinite. The Court should deny Samsung's motion for summary judgment of indefiniteness because one of ordinary skill in the art can ascertain the meaning of "the sequences" in asserted claims 7 and 18 with reasonable certainty. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). As a matter of law, the term "the sequences" in these dependent claims clearly refers back to the antecedent term "corresponding sequences" in independent claims 6 and 17.



6. A method for processing sequences in a communication system, comprising:

[6A] obtaining, by a cell or a base station or a user equipment, a group number  $k$  of a sequence group allocated by the system;

[6B] selecting, by the cell or the base station or the user equipment,  $n$  sequences from a candidate sequence collection to form sequences in a sub-group  $i$  in a sequence group  $k$ ;

[6C] wherein  $n$  is a natural number,  $i$  is a serial number of the sub-group,  $k$  is a serial number of the sequence group, a value of a basic sequence index  $r_i$  in the sub-group  $i$  in the sequence group  $k$  is at least one of  $\lfloor k \cdot N_i / N_1 \rfloor$ ,  $\lfloor k \cdot N_i / N_1 \rfloor + 1$  or  $\lfloor k \cdot N_i / N_1 \rfloor - 1$ , wherein  $N_i$  is a length of a sequence in the candidate sequence collection,  $N_1$  is a length of a reference sub-group sequence;

[6D] generating, by the cell or the base station or the user equipment, corresponding sequences according to the sequences in the formed sub-group; and

[6E] communicating, by the cell or the base station or the user equipment, according to the sequences on time frequency resources corresponding to the sub-group  $i$ .

7. The method of claim 6, wherein the sequences correspond to at least one of: Zadoff-Chu sequences and Gauss sequences.

17. A sequence processing apparatus, comprising:

[17A] a sequence selecting unit configured to obtain a group number  $k$  of a sequence group allocated by a system, and select  $n$  sequences from a candidate sequence collection to form sequences in a sub-group  $i$  in the sequence group  $k$ , wherein  $n$  is a natural number,  $i$  is a serial number of the sub-group,  $k$  is a serial number of the sequence group, a value of a basic sequence index  $r_i$  in the sub-group  $i$  in the sequence group  $k$  is at least one of  $\lfloor k \cdot N_i / N_1 \rfloor$ ,  $\lfloor k \cdot N_i / N_1 \rfloor + 1$  or  $\lfloor k \cdot N_i / N_1 \rfloor - 1$ , wherein  $N_i$  is a length of a sequence in the candidate sequence collection,  $N_1$  is a length of a reference sub-group sequence; and

[17D] a sequence processing unit is configured to generate corresponding sequences according to the sequences in the formed sub-group  $i$ , and process according to the sequences on time frequency resources corresponding to the sub-group  $i$ .

18. The sequence processing apparatus of claim 17, wherein the sequences correspond to at least one of: Zadoff-Chu sequences and Gauss sequences.

### **'239 Patent Claims 6 & 17 (annotations & highlighting added) (SS MSJ Ex. A, ECF No. 333-8)**

The claim language itself allows one to ascertain with “reasonable certainty” to which sequences “the sequences” in claims 7 and 18 refers, as illustrated above. As shown above, claim elements [6E] and [17E] also use the term “the sequences.” “[T]he sequences” in these elements refers back to the same antecedent as “the sequences” in claims 7 and 18. *Frank’s Casing Crew & Rental Tools, Inc. v. Weatherford Int’l, Inc.*, 389 F.3d 1370, 1377 (Fed. Cir. 2004) (“[T]he same terms appearing in different portions of the claims should be given the same meaning unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims.”) (quoting *Fin Control Sys. Pty, Ltd. v. OAM, Inc.*, 265 F.3d 1311, 1318 (Fed. Cir. 2001) (internal quotations marks omitted)).

When elements [6E] and [17E] use “the sequences,” they are clearly referring back to the immediately preceding “corresponding sequences” recited in claim elements [6D] and [17D]. This can be seen from the three defined sequences in the claims and how the claims refer back to each. The claims recite (in elements [6B] & [17B]) “ $n$  sequences from a candidate sequence collection” and “sequences in a sub-group  $i$  in a sequence group  $k$ ,” which Samsung refers to as the “selected” sequences and the “formed” sequences, respectively. SS MSJ Mot at 5. Claim elements [6D] and

1 [17D] recite “*corresponding sequences*,” which Samsung refers to as the “generated” sequences.

2 The claims then refer back to each sequence using different terms. First, claim elements [6C]  
3 and [17C] refer back to the “*n sequences from a candidate sequence collection*” (*i.e.*, the “selected”  
4 sequences”) as the “*sequences in the candidate sequence collection*.” Second, elements [6D] and  
5 [17D] refer back to the “*sequences in a sub-group i in a sequence group k*” (*i.e.*, the “formed”  
6 sequences) as “*the sequences in the formed sub-group*.”

7 Elements [6E] and [17E] then use the term “*the sequences*” to refer back to the third  
8 sequence, the immediately preceding generated “*corresponding sequences*,” which is the only  
9 remaining sequence without another name used to refer back to it. Similarly, when claims 7 and 18  
10 use the term “the sequences,” they are referring to the “corresponding sequences,” consistent with  
11 the terminology of elements [6E] and [17E]. If claims 7 and 18 intended to refer to either the  
12 “selected” sequences or the “formed” sequences, they would have used the short-hand terms for  
13 these sequences used in other places in the claims. Consequently, there is no confusion about which  
14 sequences “the sequences” refers to, and certainly no confusion sufficient to prove that the meaning  
15 of the term is not clear with “reasonable certainty.”

16 Indeed, Samsung must show by clear and convincing evidence that one of skill in the art  
17 would not understand “the sequences” with “reasonable certainty.” *Nautilus*, 134 S.Ct. at 2129. As  
18 explained, the claims make clear that “the sequences” refers to the only sequences not referred to by  
19 a different name—*i.e.*, the “corresponding sequences.” Nothing in the record compels a different  
20 conclusion.

21 Samsung attempts to mischaracterize Huawei’s expert testimony as a purported admission  
22 that “the sequences” could refer to three different sequences—(1) generated corresponding  
23 sequence; (2) the communicated corresponding sequences; or (3) the sequences in the subgroup. SS  
24 MSJ Mot. 7:5-11 (quoting SS MSJ Mot. Ex. C, Veeravalli Dep. 68:25-69:6). A simple review of the  
25 asserted claims and Dr. Veeravalli’s deposition testimony reveals that Dr. Veeravalli was referring  
26 not to three different sequences but to the same sequence in three different scenarios. The  
27 “generated corresponding sequences” and “communicated corresponding sequences” referenced by  
28 Dr. Veeravalli are the same sequences—the claims recite first generating and then communicating

1 using the “corresponding sequences.” SS MSJ Mot. Ex. A, ’239 Patent at claim 6 (“generating . . .  
 2 *corresponding sequences* according to the sequences in the formed sub-group; and communicating .  
 3 . . according to *the sequences* on time frequency resources corresponding to the sub-group i”)  
 4 (emphasis added). With respect to “the sequences in the subgroup,” Dr. Veeravalli explained during  
 5 his deposition that he was referring to the “extensions of the sequences that are in the subgroup” and  
 6 not the sequences in the subgroup that have not been extended/modified. SS MSJ Mot. Ex. C,  
 7 Veeravalli Dep. 69:7-12 (“Q. So is it your opinion that it refers to all of those sequences? A. I  
 8 mean, at the point it’s – the sequences that are communicated are just *extensions of the sequences*  
 9 *that are in the subgroup.*”) (emphasis added). The extensions of the sequences in the subgroup are  
 10 the “corresponding sequences” because the “corresponding sequences” are generated according to  
 11 the sequences in the sub-group. SS MSJ Mot. Ex. A, ’239 Patent at claim 6 (“generating ...  
 12 *corresponding sequences* according to the sequences in the formed sub-group”). Moreover,  
 13 Samsung misuses Dr. Veeravalli’s deposition testimony. Dr. Veeravalli is a technical expert, not a  
 14 claim construction expert or an expert in patent law. His testimony cannot change or make unclear  
 15 the clear recitation in the claims identifying “the sequences” as the corresponding sequences, as  
 16 discussed above.

17 **b. Samsung’s Fallback Non-Infringement Argument Should Also Be**  
 18 **Rejected.**

19 Samsung further contends that the term “the sequences *correspond to* at least one of: Zadoff-  
 20 Chu sequences and Gauss sequences” (in claims 7 and 18) is not satisfied because the “extended  
 21 sequences [in LTE]—which correspond to the claimed ‘corresponding’ sequences that are then  
 22 ‘communicated’ according to the claims” *are* not Zadoff-Chu or Gauss sequences. SS MSJ Mot.  
 23 9:2-6. Samsung’s argument ignores the plain language of the claims and should be rejected.

24 As explained in Huawei’s Daubert motion, claims 7 and 18 require the claimed “sequences”  
 25 to “*correspond to*” one of Zadoff-Chu or Gauss sequences, not that they *be* “Zadoff-Chu or Gauss  
 26 sequences.” HW Daubert 15:28-16:2; *see also* SS MSJ Mot. Ex. A, ’239 Patent at Claims 6 & 17.  
 27 LTE’s extended sequences<sup>2</sup> “correspond to . . . Zadoff-Chu sequences” as claimed because they are

28 <sup>2</sup> The extended sequences comprise a ZC sequence followed by the repetition of as much of that  
 sequence as is necessary to fill the extended sequence. *See* HW Daubert at 16, fn. 5.

1 formed from Zadoff-Chu sequences (which are “extended” to make the “corresponding sequences”).  
 2 HW Daubert 15:24-16:25; *see* Szczepanik Decl. Ex. 2  
 3 (<http://www.dictionary.com/browse/correspond?s=t>) (defining “correspond” as “to be in agreement  
 4 of conformity” or “to be similar or analogous”). The extended Zadoff-Chu sequences correspond to  
 5 a Zadoff-Chu sequence because they comprise a Zadoff-Chu sequence plus a repetition of as much  
 6 of that sequence as is necessary to fill out the sequence. *Id.* at 16:19-22. Samsung’s expert admits  
 7 as much. *See* Madisetti Decl. ¶¶ 21-22, ECF No. 333-5 (sequence is “a cyclic extension of a Zadoff-  
 8 Chu sequence”); HW Daubert 16:13-22, ECF No. 327-4 (citing HW Daubert Ex. 20, Madisetti Dep.  
 9 154:12-15 & HW Daubert Ex. 15, Madisetti Non-Infr. Rpt. ¶ 93 (ECF Nos. 327-20, 327-17)).

10 Samsung, conversely, ignores the claim language to argue that “*correspond to*” means  
 11 “is/are.” The Court should reject Samsung’s reading of the claims – and deny Samsung’s motion as  
 12 a matter of law because it departs from the plain and ordinary meaning of the term “correspond to.”  
 13 Indeed, given that Samsung’s expert admits that this element is met under the proper construction,  
 14 Huawei invites the Court to find this claim element met as a matter of law. *Teva Pharms USA, Inc.*  
 15 *v. Sandoz, Inc.*, 135 S.Ct. 831, 837 (2015) (“[I]t was proper to treat the ultimate question of the  
 16 proper construction of the patent as a question of law”).

17 Finally, Samsung’s argument at best demonstrates a genuine issue of fact as to whether the  
 18 extended version of Zadoff-Chu sequences used by the LTE standard “correspond to” a Zadoff-Chu  
 19 sequence. For this reason also, summary judgment is improper. *See Dorel Juvenile Group, Inc. v.*  
 20 *Graco Children’s Prods, Inc.*, 429 F.3d 1043, 1047 (Fed. Cir. 2005) (vacating summary judgment  
 21 and remanding because issues of fact existed as to whether certain features of accused products  
 22 satisfied elements of asserted claims).

**B. The Court Should Deny Samsung's Motion For Summary Judgment That The '239 Patent Is Directed To Unpatentable Subject Matter**

Whether the '239 patent claims patentable subject matter depends on the standard set out in *Alice Corp. Pty. Ltd. v. CLS Bank International*, 134 S. Ct. 2347 (2014), as more recently explained in *Berkheimer v. HP Inc.*, 881 F.3d 1360 (Fed. Cir. 2018):

“First, we determine whether the claims at issue are directed to” a patent-ineligible concept. If so, “we consider the elements of each claim both individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application.”

*Berkheimer*, 881 F.3d at 1366 (quoting *Alice Corp.*, 134 S. Ct. at 2355 and *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 78-79). The record evidence shows that the '239 patent claims satisfy both parts of this standard as a matter of law. Samsung identifies no evidence to show that the claims as a whole are abstract or lack an inventive step. The Court should therefore deny the motion and find that the '239 patent claims patentable subject matter.

Moreover, to prevail on summary judgment, Samsung must show that there are *no* disputed issues of fact regarding whether the asserted claims are abstract or contain an inventive step. *Berkheimer*, 881 F. 3d 1368. And Samsung must prove the facts underlying the abstract idea and inventive factors by clear and convincing evidence. *Id.* Huawei has presented substantial facts supporting its claims, so at the very least there are substantial disputed issues of fact regarding both prongs. The Court should deny Samsung's motion for this reason as well.

**1. The '239 Patent Does Not Claim an Abstract Idea.**

The Court, on the record available for Samsung's motion to dismiss and under the case law at that time, accepted that the claims of the '239 patent were abstract. Order Denying Mot. to Dismiss 17:19-20 (Nov. 21, 2016), ECF No. 103. With a fuller record, it is now clear that the claims are not abstract. At the very least, Federal Circuit precedent since the ruling on the motion to dismiss requires denial of Samsung's motion due to questions of fact.

In deciding Samsung's motion to dismiss, the Court analyzed the claims under the “directed to” standard. “[T]he ‘directed to’ inquiry applies a stage-one filter to claims, considered in light of the specification, based on whether their character as a whole is directed to excluded subject matter.”



ECF No. 103 at 7:18-20 (quoting *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016)) (internal quotation marks omitted). This test “asks whether the focus of the claims is on the specific asserted improvement in computer capabilities ... or, instead, on a process that qualifies as an ‘abstract idea’ for which computers are invoked merely as a tool.” *Id.* at 1335-36; *Visual Memory LLC v. Nvidia Corp.*, 867 F.3d 1253, 1258 (Fed. Cir. 2017). Moreover, the presence of a mathematical formula in a claim does not make it abstract. *Thales Visionix Inc. v. Unite States*, 850 F.3d 1343, 1348-49 (Fed. Cir. 2017) (“That a mathematical equation is required to complete the claimed method and system does not doom the claims to abstraction.”).

The record here is clear that the claims provide a specific improvement in telecommunications networks, not an idea that simply invokes computers as a tool. Huawei’s expert Dr. Veeravalli opined:

“The claimed invention therefore helps to reduce interference at the base station caused by UEs in neighboring cells and increases the base station’s ability to distinguish UEs in its cell. The ’239 Patent thereby involves improvements to the functioning and operation of a cellular communication network. The ’239 Patent allows UEs to transmit reference signals to the cell tower with reduced interference between the reference signals transmitted by different UEs connected to different cells. This reduced interference improves the cellular network by allowing the UEs to transmit reference signals that the base station is better able to distinguish as intended for it, as opposed to intended for nearby cells.”

Declaration of Venugopal V. Veeravalli, Ph.D., In Support Of Huawei’s Opp’n to Samsung’s Mot. for Summary Judgment (“Veeravalli Decl.”) ¶ 11. Also:

“The claims recite specific steps for creating a sub-group of sequences, which the inventors determined have a low correlation and low interference with subgroups in other cells. The claims are directed to an improvement in the art that is defined in a way that a person of ordinary skill in the art would understand, by defining subgroups in terms of formulas. These formulas accurately describe the selection criteria that enables the claimed invention to increase the uplink capacity of the cells, increasing the speed of data transfer and improving the mobile device user’s experience. In my opinion, a person of ordinary skill in the art would understand and expect the invention to be defined in precisely this way. Moreover, the claims are not “pure mathematics.” The claims describe a process or apparatus for implementing an improvement in a wireless system. The equations in those claims identify certain conditions that are relevant to that improved wireless system.”

1 *Id.* at ¶ 12; *see also id.* ¶¶ 4-5. The specification similarly explains the invention’s benefits to  
 2 telecommunications. *See e.g.*, SS MSJ Mot. Ex. A, ’239 Patent at 24:19-24. Indeed, the ’239  
 3 patent’s claims are similar to the one at issue in *Thales Visionix*, where, although they included a  
 4 mathematical formula, the claims were “directed to a new and useful technique for using sensors to  
 5 more efficiently track an object on a moving platform.” 850 F.3d at 1349. Analogously, the claims  
 6 here include a mathematical formula but are directed to improving a telecommunications system by  
 7 reducing interference.

8 Samsung offers no evidence to support the conclusion that the claims use computer  
 9 technology as a tool, and especially none that would satisfy the clear and convincing standard.  
 10 Indeed, its motion cites nothing but the claims and the specification. SS MSJ Mot. 11-12. Further,  
 11 Samsung fails to offer any analysis of what the claims are “directed to.” *Id.*; *see Thales Visionix*,  
 12 850 F.3d at 1346. Samsung just argues that the ’239 patent claims “the abstract idea of creating  
 13 groups of numeric sequences that are not highly correlated with each other.” SS MSJ Mot. 11:2-3.  
 14 But Samsung focuses on the sequences and sub-groups, minimizing claim elements tying the  
 15 claimed innovations to the telecommunications system that it is improving, such as “obtaining . . .  
 16 group number k . . . allocated by the system,” “generating . . . corresponding sequences according to  
 17 the sequences in the formed sub-group,” and “communicating . . . according to the sequences on  
 18 time frequency resources corresponding to the sub-group i.” SS MSJ Mot. 11-12. Tellingly,  
 19 Samsung does not argue that the claims do not describe a process to improve a telecommunications  
 20 system.

21 Samsung also improperly deconstructs the claim. Samsung argues that the “generating” and  
 22 “communicating” steps are “conventional techniques.” SS MSJ Mot. 11. First, whether a claim is  
 23 “conventional” relates primarily to the inventive step analysis, not the abstract idea step. *Aatrix*  
 24 *Software, Inc. v. Green Shades Software, Inc.*, 890 F.3d 1354, 1359 (Fed. Cir. 2018) (“whether a  
 25 claim element or combination is well-understood, routine, and conventional . . . falls under step two  
 26 in the § 101 framework”) (citing *Alice Corp.*, 134 S.Ct. at 2355) (Moore, J., concurring in the denial  
 27 of the petition for rehearing en banc). Second, analyzing whether the claim is abstract requires  
 28 looking at the entire claim as a whole, not isolated individual steps of the claims. *Diamond v. Diehr*,

1 450 U.S. 175, 188 (1981). Indeed, “it is not enough to merely identify a patent-ineligible concept  
 2 underlying the claim; we must determine whether that patent-ineligible concept is what the claim is  
 3 ‘directed to.’” *Rapid Litig. Mgmt. Ltd. v. Cellzdirect*, 827 F.3d 1042, 1050 (Fed. Cir. 2016).  
 4 Samsung never shows that the claim as a whole claims “conventional techniques,” and indeed it  
 5 cannot.

6 Given the lack of evidence from Samsung and the clear and convincing evidence standard it  
 7 must satisfy, the Court should find that the ‘239 patent does not claim an abstract idea as a matter of  
 8 law. The Court then need go no farther and may decide that the claims are patentable under Section  
 9 101. *Enfish*, 822 F.3d at 1339. But, to the extent that any dispute exists, whether the ‘239 patent  
 10 claims an abstract idea is a disputed issue of fact in view of the substantial facts Huawei has  
 11 identified, and Samsung’s summary judgment argument should be denied..

## 12 **2. The Asserted Claims of the ‘239 Patent Contain an Inventive Step.**

13 If the Court disagrees that the claims are not abstract and finds no factual dispute on that  
 14 issue, it must perform an inventive step analysis. Samsung’s motion misunderstands the law in  
 15 arguing that the ‘239 patent contains no inventive step. Whether a claim as a whole contains an  
 16 inventive concept depends on whether “each step does no more than require a generic computer to  
 17 perform generic computer functions.” *Alice Corp.*, 134 S. Ct. at 2359.

18 Samsung wrongly asserts that *Parker v. Flook*, 437 U.S. 584 (1978), requires “assuming that  
 19 the mathematical formula present in the claims falls within the prior art. If the remaining portions of  
 20 the claims present no patentable invention (i.e., have no ‘inventive concept’), then the claims contain  
 21 patentable-ineligible subject matter under § 101.” SS MSJ Mot. 10 (internal citations omitted).

22 Cases after *Flook*<sup>3</sup> have made it clear that the inventive step analysis requires analyzing the entire  
 23

24 <sup>3</sup> Various courts have noted that subsequent Supreme Court cases have limited *Flook* and its analysis  
 25 without the mathematical formula, exactly the analysis Samsung asks this Court to follow. *See*  
 26 *Diehr*, 450 U.S. at 189 n.12 (“It is argued that the procedure of dissecting a claim into old and new  
 27 elements is mandated by our decision in *Flook* which noted that a mathematical algorithm must be  
 28 assumed to be within the ‘prior art.’ It is from this language that the petitioner premises his  
 argument that if everything other than the algorithm is determined to be old in the art, then the claim  
 cannot recite statutory subject matter. The fallacy in this argument is that we did not hold in *Flook*  
 that the mathematical algorithm could not be considered at all when making the § 101  
 determination.”); *Arrhythmia Research Tech., Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1057 n.4



claim as a whole, not only the non-mathematical formula portion. *See e.g., Diehr*, 450 U.S. at 192 (“[W]hen a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect . . . then the claim satisfies the requirements of § 101.”); *Arrhythmia Research Tech.*, 958 F.2d at 1057 (“In applying this principle to an invention whose process steps or apparatus elements are described at least in part in terms of mathematical procedures, the mathematical procedures are considered in the context of the claimed invention as a whole.”); *see also Diehr*, 450 U.S. at 188 (“In determining the eligibility of respondents’ claimed process for patent protection under § 101, *their claims must be considered as a whole*. It is inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis.”) (emphasis added).

In its motion, Samsung does not dispute that the claims, which as a whole include the claimed formulas, are inventive; instead, it seeks to exclude the formulas from the analysis. SS MSJ Mot. 12-14. As explained above, that exclusion is improper. Samsung has failed to satisfy its burden to show by clear and convincing evidence that the claims as a whole do not include an inventive step. Samsung identifies no evidence that the claims as a whole are “well-understood, routine, and conventional.”

To the contrary, the evidence shows that the claims do contain an inventive step. “Whether a particular technology is well-understood, routine, and conventional goes beyond what was simply known in the prior art. The mere fact that something is disclosed in a piece of prior art, for example, does not mean it was well-understood, routine, and conventional.” *Berkheimer*, 881 F.3d at 1369. Applying the proper analysis shows that the claims contain an inventive step because they recite an improvement to telecommunications networks. Veervalli Decl. ¶¶ 16-19; *Aatrix Software v. Green Shades Software*, 882 F. 3d at 1127 (“We have repeatedly held that inventions which are directed to

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(Fed. Cir. 1992) (“Although commentators have differed in their interpretations of Benson, Flook, and Diehr, it appears to be generally agreed that these decisions represent evolving views of the Court, and that the reasoning in Diehr not only elaborated on, but in part superseded, that of Benson and Flook.”); *Cal. Inst. of Tech. v. Hughes Commc’ns Inc.*, 59 F. Supp. 3d 974, 991 (C.D. Cal. 2014) (“The court should not ignore mathematical formulas in its § 101 analysis, because a formula combined with other elements may transform an abstract idea into patentable subject matter.”).

improvements in the functioning and operation of the computer are patent eligible.”).

In addition, Samsung makes no showing that the claims preempt anything. The concern underlying the exceptions to § 101 is not tangibility, but preemption. *See Mayo*, 566 U.S. at 84-86; *see also Alice Corp.*, 134 S. Ct. at 2354 (“[T]he concern that drives this exclusionary principle as one of preemption.”). To the contrary, the evidence shows that the claims do not preempt the formula claimed. *See Veeravalli Decl.* ¶¶ 20-21.

The Court should therefore find as a matter of law that the asserted claims in the ’239 patent claim an inventive step. Samsung has failed to show that they lack such an inventive step under the correct legal standard and under the clear and convincing standard. *See Berkheimer*, 881 F. 3d 1368. Alternatively, even though Samsung offers no evidence of the inventiveness of the claim as a whole, at minimum, the parties dispute issues of fact that preclude summary judgment. The Court should deny Samsung’s motion for this reason as well.

**C. The Court Should Deny Samsung’s Motion for Summary Judgment of Non-Infringement of Huawei’s ’613 Patent.**

Samsung moves for summary judgment of non-infringement of Huawei’s U.S. Patent No. 8,724,613 (“’613 patent”) based on the alleged absence of a single claim element from the Accused Samsung Products: “receiv[ing]. . . a service sent by a base station.” *See SS MSJ Mot.* 14:8-14. The Court should deny Samsung’s motion because: (1) it ignores abundant evidence of infringement; (2) it mischaracterizes the evidence it selectively cites; and (3) it ignores plain language in claim 5 of the ’613 patent that defeats Samsung’s motion.

**1. Samsung’s Motion Ignores Abundant Evidence that the Accused Samsung Products “receive...a service sent by a base station.”**

During fact discovery in this case, Samsung and its employees provided ample evidence that the Accused Samsung Products “receive...a service sent by a base station.” Now, Samsung selectively omits discussion of that evidence in its motion. This failure alone is fatal to Samsung’s motion.

1 [REDACTED]  
2 [REDACTED]  
3 [REDACTED]  
4 [REDACTED]  
5 [REDACTED]  
6 [REDACTED]  
7 [REDACTED]  
8 [REDACTED]  
9 [REDACTED]  
10 [REDACTED]  
11 [REDACTED]  
12 [REDACTED]  
13 [REDACTED]  
14 [REDACTED]  
15 [REDACTED]  
16 [REDACTED]  
17 [REDACTED]  
18 [REDACTED]  
19 [REDACTED]  
20 [REDACTED]  
21 [REDACTED]  
22 [REDACTED]  
23 [REDACTED]  
24 [REDACTED]  
25 [REDACTED]  
26 [REDACTED]  
27 [REDACTED]  
28 [REDACTED]

[illegible]

See Akl Decl. ¶ 4b-4c. This evidence defeats Samsung's motion. See, e.g., *Radware, Ltd. v. A10 Networks, Inc.*, Case Nos. C-13-02021, C-13-02024 RMW, 2014 WL 2738538, at \*10 (N.D. Cal. June 11, 2014) (denying summary judgment because direct infringement can be based on product testing).

In addition, a plethora of other evidence permits a reasonable factfinder to conclude that the Samsung Accused Products receive eMBMS services. For instance, Samsung has echoed support for eMBMS technology in its own white papers and press releases. Samsung has predicted continued growth, and has referred to a “need for widespread adoption of this technology.” *See* Akl Decl. ¶¶ 2, 4f; Szczepanik Decl. Ex. 80 at ¶ 263; *see also id.* at ¶¶ 248-54, 258-67. The industry

association GSA, whose members include Samsung, identifies AT&T as deploying the technology, and also identifies Samsung Galaxy S5, Galaxy S6, Galaxy S8, and Galaxy S8+ phones as supporting eMBMS. *See id.* at ¶¶ 264-65; *id.* Ex. 78 at 25; *id.* Ex. 79 at 5-6, 10. Verizon has invested over \$1.5 billion over five years in streaming live NFL games to fans using the technology. *See* Szczepanik Decl. Ex. 80 at ¶ 266. Verizon is “one of the important customers” of Samsung that has the largest market share of the four major U.S. carriers, and Samsung included eMBMS functionality in its products directly in response to Verizon’s request. *See id.* at ¶ 267; Szczepanik Decl. Ex. 3, Song Dep. 25:5-12, 27:3-21. Verizon offers apps such as the go90 and Indycar apps to allow users to watch TV and live sports using eMBMS. *See* Szczepanik Decl. Ex. 80 at ¶ 248. Samsung instructs its customers on how to use apps and knows and expects its users will transmit data via eMBMS. *See id.* at ¶ 255. A reasonable inference based on these facts is that Samsung’s Accused Products have been used by end-users to receive eMBMS services.<sup>4</sup> *See, e.g., Vita-Mix Corp. v. Basic Holding, Inc.*, 581 F.3d 1317, 1326 (Fed. Cir. 2009) (“Direct infringement can be proven by circumstantial evidence.”). Samsung’s motion must be denied for this reason as well.

## 2. Samsung’s Motion Mischaracterizes the Evidence It Selectively Cites.

Not only does Samsung’s motion omit extensive evidence that the Accused Samsung Products receive a service sent by a base station, Samsung’s motion also mischaracterizes the evidence that it does selectively cite.

Samsung first argues that the [REDACTED]

SS MSJ

Mot. 15:6-9. This argument is a red herring. [REDACTED]

<sup>4</sup> Samsung’s attorney’s admission at the claim construction tutorial is also admissible evidence. *See* SS MSJ Mot. 17; *Totten v. Merkle*, 137 F.3d 1172, 1176 (9th Cir. 1998) (“Under the federal rules, a statement made by an attorney is generally admissible against the client.”); Fed. R. Evid. 801(d)(2).

1 [REDACTED]  
 2 [REDACTED]  
 3 [REDACTED]  
 4 [REDACTED]  
 5 Szczepanik Decl. Ex. 4, S.R. Kim Dep. 33:10-19 (objection omitted); *see also id.* at 25:23-26:2,  
 6 28:23-33:9; *see* Akl Decl. ¶ 4c. While Samsung claims that [REDACTED]

7 [REDACTED]  
 8 [REDACTED]  
 9 [REDACTED]  
 10 [REDACTED]  
 11 [REDACTED], and at a minimum creates a question of fact.<sup>5</sup>

12 Samsung's next argument, that "none of the Accused Products are sold preloaded" with  
 13 certain apps, is also a red herring. *See* SS MSJ Mot. 15. Similar to its middleware argument,  
 14 Samsung never explains how all of its Accused Products—including for the Verizon, Sprint, T-  
 15 Mobile, and AT&T networks—[REDACTED]  
 16 [REDACTED] *See supra*, Section B; Akl Decl. ¶¶ 2, 4b-4cc; Szczepanik Decl. Ex. 80 at ¶  
 17 166; Szczepanik Decl. Ex. 81 at ¶¶ 4-12. The [REDACTED] evidence directly establishes that  
 18 the Accused Products can and do receive eMBMS services from base stations. Akl Decl. ¶¶ 4b-4c.  
 19 Moreover, as explained above, a plethora of other evidence shows that the Accused Products receive  
 20 eMBMS services. Samsung also fails to explain why "preloading" of the apps matters. As set forth  
 21 by Huawei's expert Dr. Akl, Samsung infringes the '613 patent both directly and indirectly. Akl  
 22 Decl. ¶¶ 2, 4; Szczepanik Decl. Ex. 80 at ¶¶ 247-56. Even if an end-user rather than Samsung  
 23 downloads an app, Samsung is still liable for infringement.

24 Lastly, Samsung contends that AT&T, Sprint, and T-Mobile do not permit [REDACTED]  
 25

26 <sup>5</sup> Samsung's claim that Dr. Akl, Huawei's expert, [REDACTED]  
 27 [REDACTED]

28 *See* Szczepanik Decl. Ex. 80 at ¶ 166. He did not review the source code because Samsung appears to have never produced it in discovery, despite being required to do so. *See* J. Case Mgmt. Statement at 23 (Sept. 6, 2016), ECF No. 67 (listing deadline to make source code available).

1 [REDACTED]. SS MSJ Mot. 16. Samsung does not and cannot explain how that contention  
 2 is relevant. Huawei need not prove that a use is [REDACTED] to prove infringement. *See* 35  
 3 U.S.C. § 271. And even if that were a requirement, there is extensive evidence of [REDACTED]  
 4 [REDACTED] and Verizon and AT&T deploying eMBMS technology. Akl Decl. ¶  
 5 4; e.g., Szczepanik Decl. Ex. 80 at ¶¶ 167-236, 248-67.

### 6 3. The Arguments in Samsung's Motion Do Not Apply to Claim 5.

7 Samsung's motion ignores language in claim 5 of the '613 patent that is fatal to Samsung's  
 8 motion, even if the Court were to accept all of Samsung's arguments. Claim 5 is an apparatus claim  
 9 that requires "a user equipment **comprising**: circuitry **configured to** receive a service sent by a base  
 10 station." Claim 5 does not require actually "receiving" a service. *See Texas Advanced*  
 11 *Optoelectronic Sols., Inc. v. Renesas Electrs. Am., Inc.*, 2016-2021, -2208, -2235, 2018 WL  
 12 3358927, at \*17 (Fed. Cir. July 9, 2018) ("Although infringement of the apparatus claims requires  
 13 that Intersil's products have the ability to perform in Mode 3, infringement does not require actual  
 14 use of Intersil's products in Mode 3."); *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1216-17  
 15 (Fed. Cir. 2014). In addition, use of the term "'comprising' creates a presumption that the recited  
 16 elements are only a part of the device, that the claim does not exclude additional, unrecited  
 17 elements." *MagSil Corp. v. Hitachi Glob. Storage Techs., Inc.*, 687 F.3d 1377, 1383 (Fed. Cir.  
 18 2012) (citation omitted).

19 As a result, even if the Court were to accept all of the arguments in Samsung's motion  
 20 regarding the '613 patent, Samsung's motion would still fail as a matter of law for claim 5 because  
 21 Samsung cannot dispute that all of its Accused Products comprise circuitry configured to receive a  
 22 service sent by a base station. Namely, Samsung does not dispute that all of its Accused Products  
 23 contain [REDACTED]

24 [REDACTED]

25 [REDACTED]

26 [REDACTED]

27 [REDACTED]

28 [REDACTED]

1 [REDACTED]  
2 [REDACTED]  
3 [REDACTED]  
4 [REDACTED]  
5 [REDACTED] A modem is “circuitry.” *See* Ak1 Decl. ¶ 4d. In addition, as explained above,  
6 extensive evidence of [REDACTED] shows that the Samsung phones (as a whole) are  
7 configured to receive eMBMS services.

8 Therefore, even if the Court were to accept all of Samsung’s arguments, which it should not  
9 do for the reasons explained above, the Court must still deny summary judgment with respect to  
10 claim 5. *See, e.g., Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1203 (Fed. Cir. 2010)  
11 (“Defendants claim that our court has held that ‘locked’ or disabled products cannot infringe  
12 apparatus claims. Their reliance on our precedent is misplaced.”); *Carucel Invs., L.P. v. Novatel*  
13 *Wireless, Inc.*, Case No.: 16-cv-118-H-KSC, 2017 WL 1394068, at \*4 (S.D. Cal. Mar. 2, 2017)  
14 (denying motion for summary judgment of non-infringement of claims with “configured to”  
15 language, based in part on evidence that “designing and testing was undertaken to ensure that the  
16 accused products” could satisfy the claim element).

17 **D. The Court Should Deny Samsung’s Request for Summary Judgment that the**  
18 **’105 Patent is Valid Over Motorola.**

19 Samsung alleges that the internal draft of Motorola’s 3GPP submission R1-050245  
20 (“Motorola Draft R1-050245”) is not prior art under 35 U.S.C. §102(g)(2). SS MSJ Mot. 18-20.  
21 Specifically, Samsung alleges that Motorola Draft R1-050245 was not reduced to practice as a  
22 matter of law because Motorola abandoned two patent applications. *Id.* at 19. [REDACTED]  
23 [REDACTED]  
24 [REDACTED]

25 [REDACTED] Declaration of Mark Mahon, Ph.D. in Support  
26 of Huawei’s Opp’n to Samsung’s Mot. for Summary Judgment (“Mahon Decl.”) ¶¶ 5-7; *see also*  
27 Szczepanik Decl. Ex. 11, Ghosh Dep. 54:2-56:2, 74:22-75:7; Szczepanik Decl. Ex. 12, Motorola  
28 Draft R1-050245 at 9-10. Motorola Draft R1-050245 therefore qualifies as prior art under 35 U.S.C.



1 § 102(g)(2) because Motorola “was the first party to conceive of the invention and then exercised  
2 reasonable diligence in reducing that invention to practice.” *Fox Grp., Inc. v. Cree, Inc.*, 700 F.3d  
3 1300, 1304 (Fed. Cir. 2012) (citations omitted). At the very least, Samsung cannot show that there  
4 are no disputed issues of fact surrounding Motorola’s reduction to practice.

5 [REDACTED]  
6 [REDACTED]  
7 [REDACTED]  
8 [REDACTED]  
9 [REDACTED]  
10 [REDACTED]  
11 [REDACTED]  
12 [REDACTED]  
13 [REDACTED]  
14 [REDACTED]  
15 [REDACTED]  
16 [REDACTED]  
17 [REDACTED]  
18 [REDACTED]  
19 [REDACTED]  
20 [REDACTED]  
21 [REDACTED]  
22 [REDACTED]  
23 [REDACTED]  
24 [REDACTED]  
25 [REDACTED]  
26 [REDACTED]

27 \_\_\_\_\_  
28 <sup>6</sup>Samsung does not contest Motorola’s diligence or that Motorola conceived of Motorola Draft R1-050245. *See* SS MSJ Mot. 18-20.

Computer simulations have been found to be sufficient evidence to show an actual reduction to practice such that summary judgment was inappropriate. *Mosaid Techs. Inc. v. Samsung Elecs. Co.*, 362 F. Supp. 2d 526, 547–48 (D.N.J. 2005) (“But surely, in this technologically advanced society of ours, there are areas of science where a successfully run simulation represents the end of the inventive process and the construction of the physical embodiment is but a matter of mere routine and mechanical application. In that case, and only in that case, it seems appropriate that a simulation should be a valid reduction to practice.”).

Mahon Decl. ¶¶ 6-7.

This constitutes reduction to practice. *See Fox Grp.*, 700 F.3d at 1305 (reduction to practice requires that the inventor “performed a process that met all the [invention] limitations” and “determined that the invention would work for its intended purpose”).

Accordingly, the only record evidence shows that Motorola Draft R1-050245 was reduced to practice and is therefore prior art under 35 U.S.C. §102(g)(2). And to the extent this reduction to practice is not indisputable, whether these simulations constitute a reduction to practice is a disputed issue of material fact. Thus, the Court should deny Samsung’s motion for summary judgment that Motorola Draft R1-050245 is not prior art.

**E. Huawei is Not Pursuing an Inequitable Conduct Defense for Samsung’s ’105 Patent.**

As noted by Samsung, Huawei alleged inequitable conduct for Samsung’s ’105 patent in its Patent Local Rule 3-3 supplemental invalidity contentions, served on September 22, 2017. Szczepanik Decl. Ex 15. The allegation was premised, in part, on the fact that neither Samsung nor inventor Farooq Khan provided any prior art references to the Patent Examiner during prosecution of the ’105 application, as shown on the face of the patent. *Id.* at pp. 111-113. In its supplemental invalidity contentions, Huawei explained that neither Samsung nor Mr. Khan

1 provided the Patent Examiner with Working Group papers from the 3GPP TSG RAN Working  
2 Group meeting held in Beijing, China in April 2005, that were material to the '105 patent. *Id.*  
3 Huawei's invalidity contentions explained that both Samsung and Mr. Khan attended the meeting  
4 and had access to the Working Group papers distributed at the meeting. *Id.* The most reasonable  
5 inference from this circumstantial evidence is that Mr. Khan and Samsung withheld material  
6 information from the Patent Examiner with the intent to deceive. *See Am. Calcar, Inc. v. Am.*  
7 *Honda Motor Co.*, 768 F.3d 1185, 1190–91 (Fed. Cir. 2014) (“We recognize instead that  
8 ‘[b]ecause direct evidence of deceptive intent is rare, a district court may infer intent from indirect  
9 and circumstantial evidence,’ provided that such intent is the single reasonable inference.”) (citing  
10 *Therasense, Inc. v. Becton, Dickinson and Co.*, 649 F.3d 1276, 1290-91 (Fed. Cir. 2011) (en  
11 banc)).

12 Following service of the supplemental invalidity contentions, Huawei proceeded with  
13 discovery to determine whether there were sufficient facts to plead inequitable conduct with the  
14 requisite particularity. Based upon a review of the deposition testimony, the documents produced  
15 by Samsung in the case, and the expert report of Dr. Paul Min, Huawei has concluded that the  
16 record facts do not support a pleading of inequitable conduct defense with the required  
17 particularity. As a result, Huawei will not be proceeding with a defense of inequitable conduct on  
18 the '105 patent.

### 19 **III. CONCLUSION**

20 For the reasons stated above, Huawei respectfully requests this Court grant deny Samsung's  
21 motions for summary judgment.  
22  
23  
24  
25  
26  
27  
28

1 Dated: July 17, 2018

Respectfully submitted,

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